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 Applied Hydraulics, 1646
 Arch Dam Investigation, 1645
 Boiler Feed and Boiler Water
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 Boiler Feed Water: Its Effects,
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 Civil Engineering Handbook, 1646
 Corrosion. Causes and Preven-
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 Cours de chimie industrielle. Fasc.
 1. Eaux, origine, composition,
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 1644
 Dampfkesselschäden, ihre Ursach-
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 Das Wasser in der Industrie und
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 Die physikalische Chemie der Kes-
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 Die Stadtentwässerung in Deutsch-
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 Doucil for Softening Water, 1800
 Elements of Water Supply Engi-
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 Handbuch der Hydrologie, 1645
 Hetch Hetchy, 1646
 Hydraulics, 1646
 Hydrographie, 1801
 Indicators. Distant Indication
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 L'eau, 1644

- Lehrbuch der Grundwasser- und Quellenkunde, 1644
- Linnology, 1645
- Parvianalyse chimique et toxicologique des eaux potables, 1644
- Power Supply Economics, 1646
- Procedure Handbook of Arc Welding Design and Practice, 1446
- Public Utility Valuation for Purposes of Rate Control, 1646
- Qualités de l'Eau et Moyens de Correction, 1442
- Sedgewick's Principles of Sanitary Science and Public Health, 1645
- Swimming Bath Water Purification, 1644
- Text Book of Hydraulics, 1646
- The Control of Water Softening and Boiler Water Conditioning, 1447
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- The Work of the Sanitary Engineer, 1801
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